

CLAIMS

1. A method of using a base station almanac for position determination in a wireless communication network, comprising:

storing, for the base station almanac, a plurality of records for a plurality of transmitting entities in the wireless communication network, wherein each of the plurality of records supports at least one protocol for position determination, and wherein the base station almanac supports a plurality of protocols for position determination; and

performing position determination for each of the plurality of protocols based on records supporting the protocol.

2. The method of claim 1, wherein the plurality of protocols include IS-801.

3. The method of claim 1, wherein the plurality of protocols include J-STD-36.

4. The method of claim 1, wherein the plurality of protocols include Global System for Mobile Communications (GSM) 04.31 Radio Resource LCS Protocol (RRLP).

5. A position determination system comprising:

a storage unit for storing a base station almanac with a plurality of records for a plurality of transmitting entities in a wireless communication network, wherein each of the plurality of records supports at least one protocol for position determination, and wherein the base station almanac supports a plurality of protocols for position determination; and

a controller operative to perform position determination for each of the plurality of protocols based on records supporting the protocol.

6. A position determination apparatus, comprising:

means for storing a base station almanac with a plurality of records for a plurality of transmitting entities in a wireless communication network, wherein each of the plurality of records supports at least one protocol for position determination, and

wherein the base station almanac supports a plurality of protocols for position determination; and

means for performing position determination for each of the plurality of protocols based on records supporting the protocol.

7. A method of using a base station almanac for position determination in a wireless communication network, comprising:

storing a protocol type value for each of a plurality of records of the base station almanac, the protocol type value indicating at least one protocol for position determination supported by the record;

storing at least one sector identifier for each of the plurality of records, one sector identifier for each of the at least one protocol supported by the record, each sector identifier being defined based on the associated protocol; and

selecting a record for use for position determination based on the at least one sector identifier stored for the record.

8. The method of claim 7, wherein the base station almanac supports a plurality of protocols for position determination, and wherein the at least one protocol supported by each record is among the plurality of protocols.

9. The method of claim 8, wherein the plurality of protocols include IS-801, and wherein a sector identifier for IS-801 comprises a system identifier (SID), a network identifier (NID), and a base station identifier (baseID).

10. The method of claim 8, wherein the plurality of protocols include J-STD-36, and wherein a sector identifier for J-STD-36 comprises a market identifier (MarketID), a switch number (SwitchNumber), and a base station identifier (baseID).

11. The method of claim 8, wherein the plurality of protocols include Global System for Mobile Communications (GSM) 04.31 Radio Resource LCS Protocol (RRLP), and wherein a sector identifier for GSM comprises a mobile country code (MCC), a mobile network code (MNC), a location area code (LAC), and a cell identifier (CI).

12. The method of claim 8, wherein the plurality of protocols include Universal Mobile Telecommunications System (UMTS), and wherein a sector identifier for UMTS comprises a location area code (LAC), a mobile network code (MNC), a radio network controller identifier (RNC-ID), and a cell identifier (CI).

13. A position determination system comprising:

a storage unit for storing a base station almanac with a plurality of records for a plurality of transmitting entities in a wireless communication network, wherein each of the plurality of records includes a protocol type value indicating at least one protocol for position determination supported by the record, wherein each record further includes at least one sector identifier, one sector identifier for each of the at least one protocol supported by the record, each sector identifier being defined based on the associated protocol; and

a controller operative to select a record for use for position determination based on the at least one sector identifier stored for the record.

14. A method of using a base station almanac for position determination in a wireless communication network, comprising:

storing, in a single record of the base station almanac, at least two sector identifiers for a transmitting entity associated with the record, wherein each of the at least two sector identifiers is defined based on a respective protocol for position determination supported by the record; and

selecting the record for use for position determination based on the at least two sector identifiers stored for the record.

15. The method of claim 14, wherein the record includes a first sector identifier defined based on IS-801.

16. The method of claim 15, wherein the record further includes a second sector identifier defined based on J-STD-36.

17. A method of using a base station almanac for position determination in a wireless communication network, comprising:

storing, in a single record of the base station almanac, at least two data values for an attribute of a transmitting entity, wherein each of the at least two data values is stored in a respective instance or part of a field in the record for the attribute of the transmitting entity; and

using the at least two data values in the field of the record for position determination for wireless terminals in the wireless communication network.

18. The method of claim 17, wherein the at least two data values are for at least two identifiers for the transmitting entity.

19. The method of claim 17, wherein the at least two data values are for a function used to estimate coverage area of the transmitting entity.

20. The method of claim 17, wherein the at least two data values are for at least two maximum antenna ranges (MARs) for the transmitting entity.

21. The method of claim 17, wherein the at least two data values are for at least two frequencies used by the transmitting entity.

22. The method of claim 21, wherein the record further includes a calibration value for each of the at least two frequencies.

23. The method of claim 17, further comprising:
storing, in a single entry of the single record, attributes for the at least two data values.

24. A method of using a base station almanac for position determination in a wireless communication network, comprising:

storing, in a single record of the base station almanac, at least two maximum antenna ranges (MARs) for a transmitting entity associated with the record; and

using the at least two MARs for position determination for wireless terminals in the wireless communication network.

25. The method of claim 24, wherein each of the at least two MARs is associated with a respective reference power level, and wherein each MAR is indicative of a geographic area within which a wireless terminal is expected to be located if received signal strength measured by the wireless terminal for the transmitting entity meets or exceeds the reference power level associated with the MAR.

26. The method of claim 24, further comprising:
obtaining an estimated MAR based on the at least two MARs, wherein the estimated MAR is used for position determination.

27. The method of claim 26, further comprising:
selecting one of the at least two MARs based on received signal strength measured by a wireless terminal for the transmitting entity, wherein the estimated MAR is equal to the selected MAR.

28. The method of claim 26, wherein the estimated MAR is obtained by interpolating between the at least two MARs.

29. The method of claim 26, wherein the estimated MAR is obtained by curve fitting the at least two MARs.

30. The method of claim 26, further comprising:
estimating a coverage area for the transmitting entity based on the estimated MAR.

31. The method of claim 26, further comprising:
deriving a position estimate for the wireless terminal based on the estimated MAR.

32. The method of claim 26, further comprising:
providing assistance data for the wireless terminal based on the estimated MAR, wherein the assistance data is used by the wireless terminal to search for and process satellite signals.

33. A position determination system comprising:
a storage unit for storing, in a single record of the base station almanac, at least two maximum antenna ranges (MARs) for a transmitting entity associated with the record; and
a controller operative to use the at least two MARs for position determination for wireless terminals in a wireless communication network.

34. A position determination apparatus, comprising:
means for storing, in a single record of the base station almanac, at least two maximum antenna ranges (MARs) for a transmitting entity associated with the record; and
means for using the at least two MARs for position determination for wireless terminals in the wireless communication network.

35. A method of using a base station almanac for position determination in a wireless communication network, comprising:
storing an enclosed space indicator for each of a plurality of records of the base station almanac, wherein the enclosed space indicator for each record indicates whether a transmitting entity described by the record is associated with an enclosed environment; and
using enclosed space indicators for the plurality of records for position determination for wireless terminals in a wireless communication network.

36. The method of claim 35, further comprising:
identifying a transmitting entity for a signal received by a wireless terminal;
retrieving a record in the base station almanac for the transmitting entity; and
performing position determination for the wireless terminal using the enclosed space indicator for the retrieved record.

37. The method of claim 36, further comprising:
omitting a search for satellite signals if the enclosed space indicator for the retrieved record indicates an enclosed environment for the identified transmitting entity.

38. The method of claim 36, further comprising:
reporting the wireless terminal to be in an enclosed environment if indicated by
the enclosed space indicator for the retrieved record.

39. A position determination system comprising:
a storage unit for storing an enclosed space indicator for each of a plurality of
records of the base station almanac, wherein the enclosed space indicator for each
record indicates whether a transmitting entity described by the record is associated with
an enclosed environment; and
a controller operative to use enclosed space indicators for the plurality of records
for position determination for wireless terminals in a wireless communication network.

40. A method of using a base station almanac for position determination in a
wireless communication network, comprising:

storing a repeater flag for each of a plurality of records of the base station
almanac, wherein the repeater flag for each record indicates whether the record
describes a coverage area for a transmitting entity or a generalized coverage area for a
plurality of transmitting entities; and

using repeater flags for the plurality of records for position determination for
wireless terminals in the wireless communication network.

41 The method of claim 40, where the plurality of transmitting entities
comprise one transmitting entity and a plurality of repeaters of the one transmitting
entity.

42 The method of claim 40, where the plurality of transmitting entities
comprise a distributed antenna system.

43 The method of claim 40, where the plurality of transmitting entities
comprise a plurality of repeaters of a specific transmitting entity, but not the specific
transmitting entity.

44 The method of claim 40, where the transmitting entity is a repeater of
another transmitting entity.

45. The method of claim 40, further comprising:

storing, for each record describing the generalized coverage area for a transmitting entity and repeaters of the transmitting entity, a watermark identifier for each of the repeaters of the transmitting entity, wherein the watermark identifier for each repeater identifies a physical property of a watermark used by the repeater.

46. The method of claim 45, wherein the watermark ID for each repeater identifies a frequency used by the repeater to modulate a signal transmitted by the repeater.

47. The method of claim 40, further comprising:

storing, for each record describing the generalized coverage area for a transmitting entity and repeaters of the transmitting entity, a repeater type for each of the repeaters of the transmitting entity, wherein the repeater type for each repeater indicates whether the repeater is coupled to the transmitting entity via a wireline link or a wireless link.

48. A position determination system comprising:

a storage unit for storing a repeater flag for each of a plurality of records of the base station almanac, wherein the repeater flag for each record indicates whether the record describes a coverage area for a transmitting entity or a generalized coverage area for the transmitting entity and repeaters of the transmitting entity; and

a controller operative to use repeater flags for the plurality of records for position determination for wireless terminals in a wireless communication network.